



ONAP

OPEN NETWORK AUTOMATION PLATFORM

Usecase UI Kohn Architecture Review

Architecture Subcommittee Review

21st June, 2022

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Ref: ITU-T “Scenarios and Requirements of Intent-Based Network for Network Evolution”

REQ-1214: Maintenance and Enhancement of Intent-driven Closed-loop Autonomous Networks in R11

Intent-based networking is applied to support the smart interaction between users (customers/operators) and networks. Based on the closed-loop automation of ONAP, the proposal of **Intent-driven Closed-loop Autonomous Networks** is proposed for the smart operation of networks. In R11, the proposal enhances the functions of intent interaction and intent guarantee for CCVPN and E2E Slicing usecases.

Key Contacts - Dong Wang (China Telecom), Keguang He(CMCC), Henry Yu (Huawei), Ahila Pandaram (Wipro), Kevin Tang (STL)

Executive Summary - Intent-based networking (IBN) is a self-driving network that uses decoupling network control logic and closed-loop orchestration techniques to automate application intents. An IBN is an intelligent network, which can automatically convert, verify, deploy, configure, and optimize itself to achieve target network state according to the intent of the operators, and can automatically solve abnormal events to ensure the network reliability. In R11, the proposal enhances the functions of intent interaction and intent guarantee for CCVPN and E2E Slicing usecases.

Business Impact - It is a challenging problem for networks to satisfy users' intents in real time. The REQ intent-based networking provides intent interaction and guarantee functions for users.

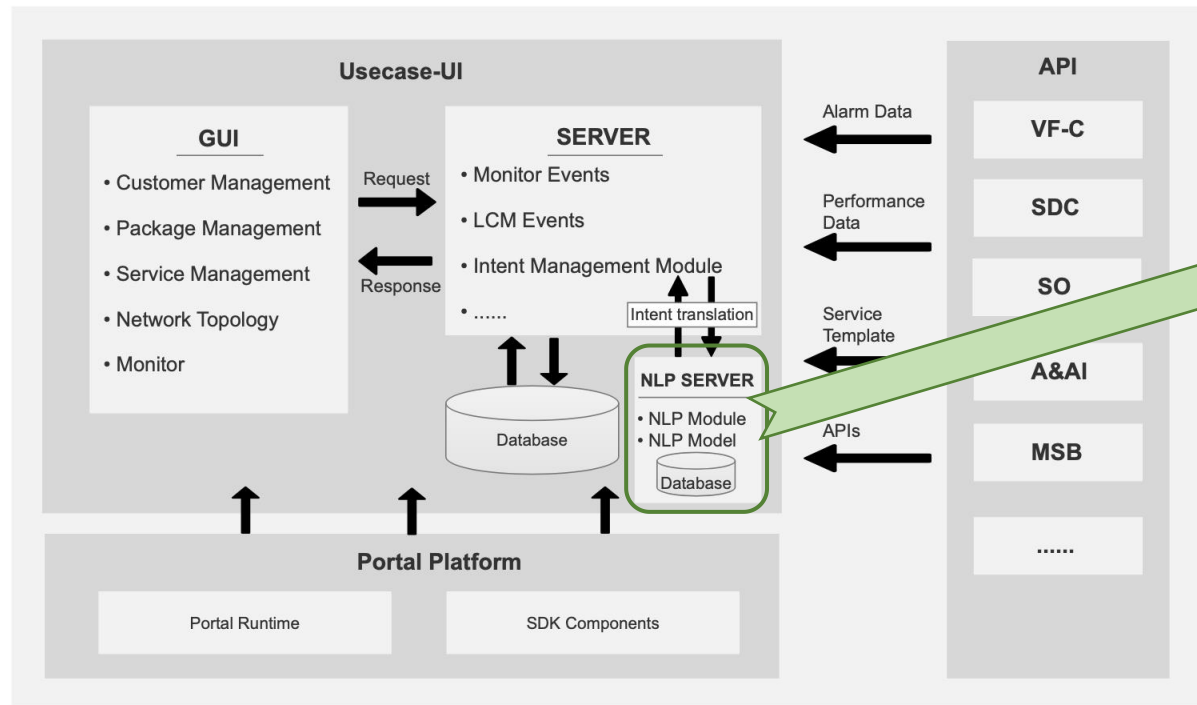
Business Markets - This REQ provides a novel solution of Intent-driven Closed-loop Autonomous Networks with two closed-loops, intent interaction closed-loop and intent guarantee closed-loop. And intent instance is used to manage users' real-time intents.

Funding/Financial Impacts - Intent-based networking simplifies interaction and network configuration to save OPEX cost. It also provides the services to satisfy users' real-time intents, so as to increase the income of operators with few investments.

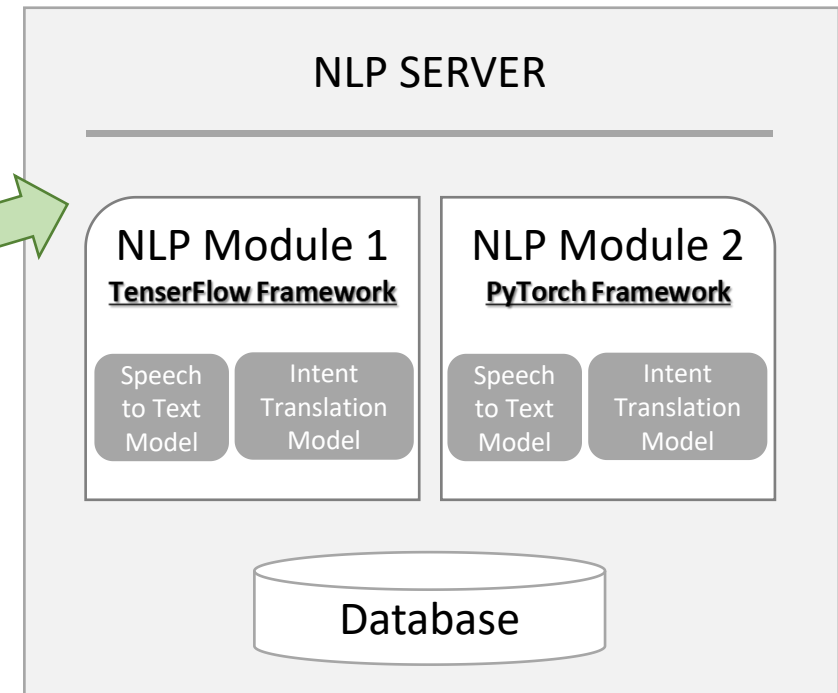
Organization Mgmt, Sales Strategies - *There is no additional organizational management or sales strategies for this requirement outside of a service providers "normal" ONAP deployment and its attendant organizational resources from a service provider.*

Enhancement of NLP platform and model in UII

- **Task 1:** Add PyTorch framework to support more models (TensorFlow framework has been added since Honolulu Release).
- **Task 2:** Improve the accuracy rate of intent translation with multiple models.
- **Task 3:** Enhance the function of STT (speech to text).



Components of UII since Honolulu Release



Enhancement of NLP microservice in UII

Projects Impact

■ FR1: Enhance NLP platform and model

Project	Impact	Notes
UII	<ul style="list-style-type: none">● Enhance the functions in NLP microservice;● Enhance the STT and Intent Translation models;● Support the intent management for E2E Slicing usecase.	
AAI	n/a	re-use the Intent Instance node
DCAE	<ul style="list-style-type: none">● Integrate the ML MS for Closed-loop (PoC of E2E Slicing in R10);● Add the function of listening in updated intent for E2E Slicing.	re-use the AAI-EVENT
Doc	<ul style="list-style-type: none">● Maintain the documentation.	

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REQ-1267 General intent model and general intent interface

For complex intent, such as the intent of cloud leased line, it is necessary to decompose the complex intent into sub intents of different dimensions, and implement the user's original intent through the execution of sub intents. So we need to deal with machine-machine intent, and for different intents or sub intents in the system, it is necessary to provide general intent model and general intent interface to ensure that all intents(especially machine-machine intents) operate according to the same expression and process.

Key Contacts - Lingli Deng(CMCC), Keguang He (CMCC), Chuanyu Chen (Huawei), Dong Wang (China Telecom), Henry Yu(Huawei)

Executive Summary - This requirement provides general intent model and general intent interface in ONAP to make all intents(especially machine-machine intents) in the system operate in the same way. At the same time, for complex intents, the technology of intent decomposition and orchestration is provided, and the above ideas and schemes are fully implemented in ONAP through a use case based on cloud leased line.

Business Impact - Complex intents can be decomposed into simple intents, and the modeling and interaction of intents can be ensured to be handled in a unified way.

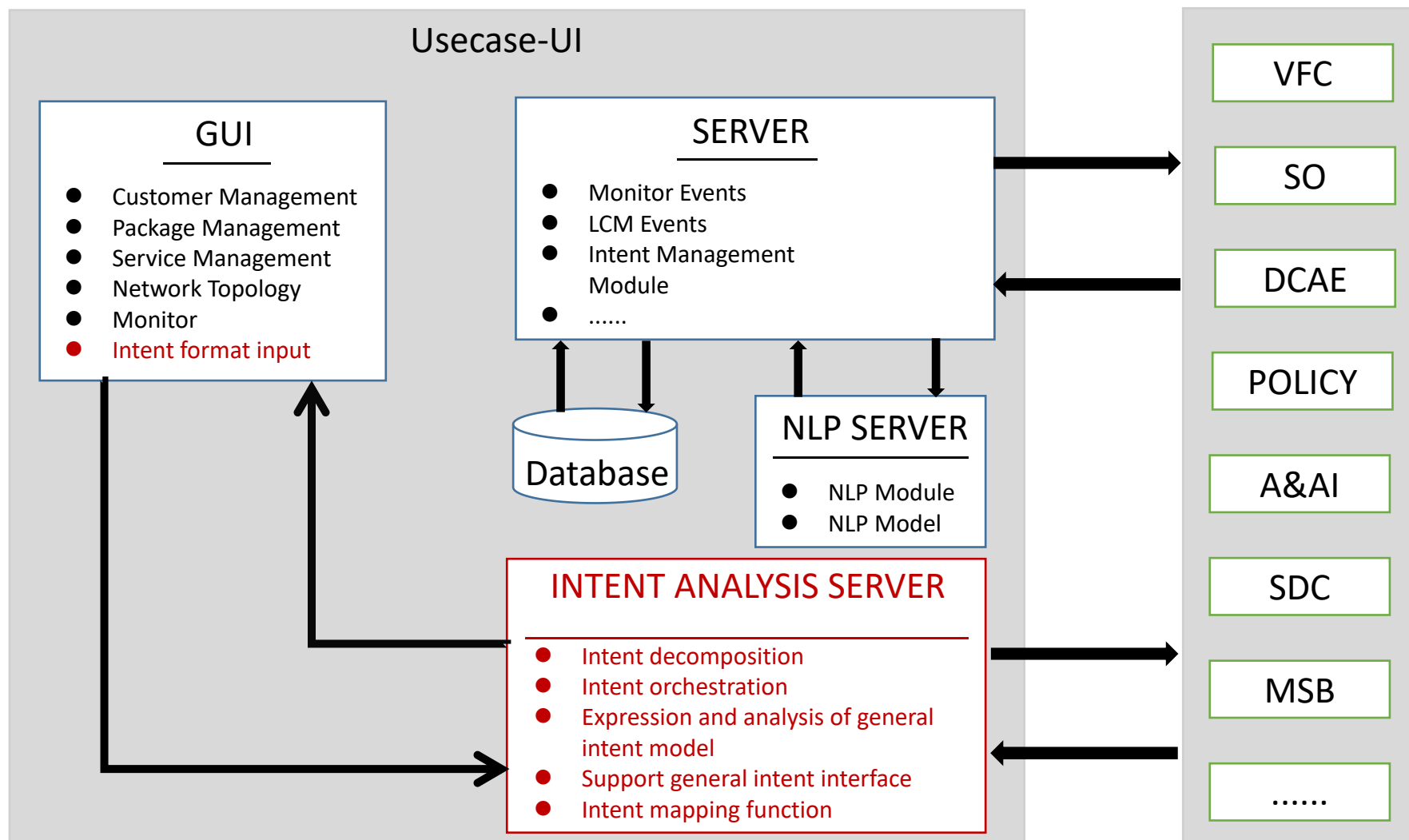
Business Markets - This REQ provides a novel solution to intent modeling and interaction:

1. It provides model federation mechanism to make the intent modeling execute according to the unified specification, and can reuse the existing domain related models which enables extension to different application scenarios.
2. It provides the unified intent interface, which makes the intent interaction in the running state more interoperable and manageable.

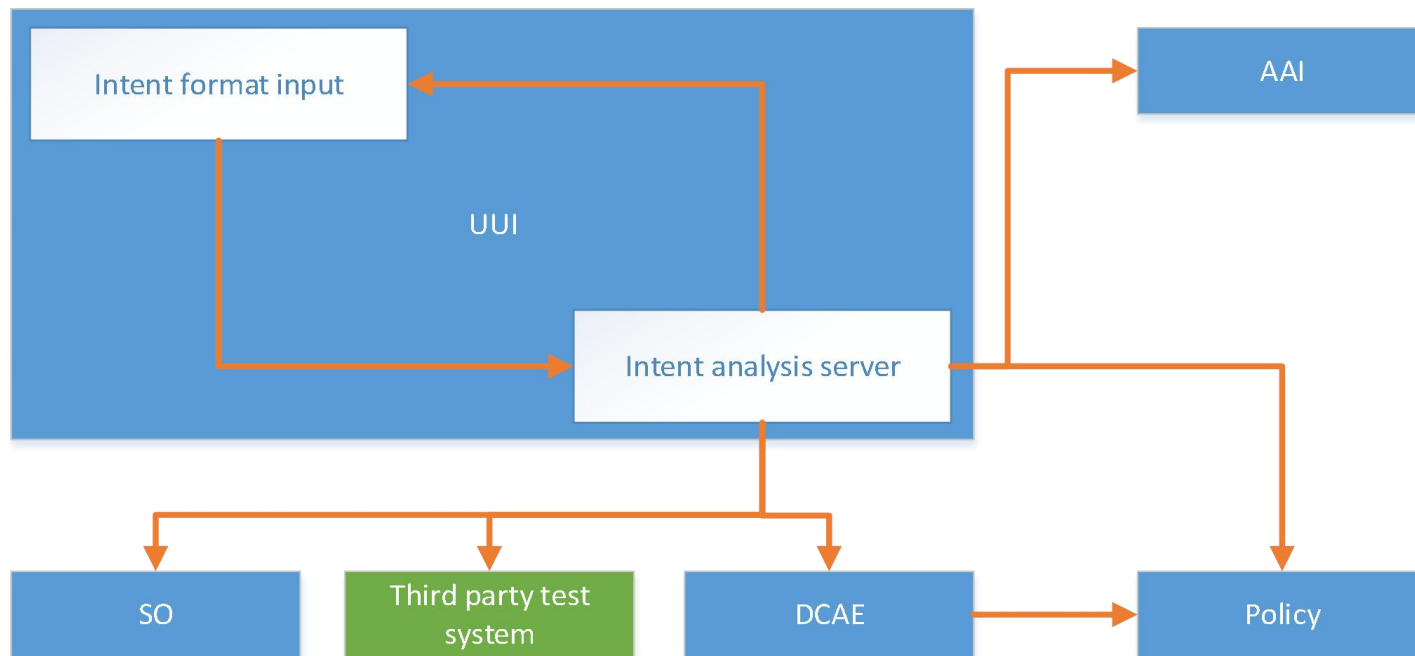
Funding/Financial Impacts - By formulating general intent modeling methods and interactive interfaces, standardize the intent operation process, improve user friendliness, improve the customer experience and increase the business value.

Organization Mgmt, Sales Strategies -*There is no additional organizational management or sales strategies for this requirement outside of a service providers "normal" ONAP deployment and its attendant organizational resources from a service provider.*

Add intent analysis micro service in UUI



Interaction with existing ONAP components



The following intents can be supported:

- Intent related to deployment and modification based on SO.
- Intent related to verification based on third party test system.
- Intent related to assurance based on DCAE.

Use the following components to support our requirements:

- Use AAI to save intent related information.
- Intent analysis server uses policy to support intent decomposition and decision making.
- DCAE uses policy to perform intent related assurance operations.

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REQ-1215 E2E Network Slicing use case enhancements for Kohn release

1. E2E Network slicing Solution

- Dynamic Discovery of Core & RAN endpoints at NSMF (carry-over requirement from Jakarta)
 - NSMF discovers the Core and RAN endpoints of back haul dynamically at the time of slice allocation/reuse
 - Front haul and mid haul end points discovery is a stretch goal
 - Only design is considered in Kohn release. Implementation will be done in future release
- IBN driven E2E Network Slicing
 - Integration of ML prediction MS with DCAE (covered by both IBN and network slicing use cases)
 - Enhancement to intent creation and update to workflow to support E2E Network Slicing based on UUI, AAI and DCAE (covered by IBN use case)
 - Enhancement to the closed-loop/ML MS and KPI monitoring to support IBN
- mIoT slice support
 - Support Slice creation, activation, deactivation and termination for mIoT applications
 - Solution design and offline implementation to main branch is considered in Kohn release. Implementation will be done in future release
- New network slicing KPI monitoring in UUI
 - KPI Computation MS to store the KPIs of Network Slice, invoke Datalake API
 - UUI to fetch the new KPIs from DES, fit and display the additional KPIs on the screen
- Use case test automation (carry-over requirement from Jakarta)
 - Carry out test automation for slicing use case in phases over multiple releases
 - Target to accomplish test automation for manual configurations

2. RAN Slicing

- RAN slice O-RAN A1-based action flow over A1 interface
 - Only design is considered in Kohn release. Implementation will be done in future release
- xNF configuration data update to CPS via ONAP DMI Plugin for RAN slice allocation
- CSIT for RAN slicing

3. Transport Slicing (covered by CCVPN use case)

- Align TN interface with latest IETF TN slice model
- Open source IETF/ACTN network controller simulator
- CSIT for transport slicing

USECASEUI-678 UUI impacts for E2E Network Slicing in Kohn Release

Impacts are identified in UUI for the below requirements of Network Slicing use case

1. Network slicing KPI Monitoring for IBN - Fetch the new KPIs from DES, fit and display the additional KPIs in the screen
2. Dynamic discovery of back haul Core and RAN endpoints at NSMF
 - A multi-release effort, design only in Kohn release, no impact to UUI implementation for K release

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USECASEUI-405 2 components in one Docker

a docker container should have only 1 component.

UI Server has JAVA + Postgresql.

Please use common postgresql chart instead of embedding your database server.

It's a bad practice and can lead to security issues

Pawel Pawlak, Amy Zwarico, Krzysztof Opasiak, Morgan Richomme, Eric Debeau, Michal Jagiello

- Use a separate Postgres docker container.
- Modify the existing code of UI server to point to the new database.
- Modify the deployment script of the UI server to not deploy the database.

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Key Features

- **Task 1: Add PyTorch framework to support more models (TensorFlow framework has been added since Honolulu Release).**
- **Task 2: Improve the accuracy rate of intent translation with multiple models.**
- **Task 3: Enhance the function of STT (speech to text).**
- **Task4: Add intent analysis micro service in UUI.**
- **Task5: Add intent format input in UUI portal.**
- **Task6: Use common postgresql chart instead of embedding your database server.**



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Thanks!